

The echinoderm Genus *Henricia* Gray, 1840 (Asteroidea: Echinasteridae) in southern and southeastern Australian Waters, with the Description of a new Species

FRANCIS W. E. ROWE and E. LYNNE ALBERTSON

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F. W. E. Rowe and E. L. Albertson, Division of Invertebrate Zoology (Echinoderms), Australian Museum, Sydney, Australia 2000; manuscript received 21 October 1986, accepted for publication 18 February 1987.

INTRODUCTION

Some 12 specimens of *Henricia*, collected during the 'Endeavour' Expeditions (1909-1914) from between Gabo Island, Victoria and westward to the Great Australian Bight, have been identified by H. L. Clark (1916) and echinoderm taxonomists in the Australian Museum (unpublished) as *H. hyadesi* (Perrier). Clark (1916) commented on the '... considerable diversity in proportions and in the spinulation ...' of the material before him. He concluded that he was unable to recognize more than a single species, *H. hyadesi*, previously recorded from South American waters. He noted the relatively deep water from which material he had examined had been collected (91-365m) and suggested the South American and Australian *Henricia* might be distinct. Although Clark reported 11 specimens from the 'Endeavour' collections, only six of the 12 remaining in the Australian Museum collections can be confirmed, by the senior author, as having been identified by Clark. The remaining six specimens have been identified by other echinoderm taxonomists working in the Museum, who compared them with those seen by Clark.

Fisher (1940), following the examination of three of H. L. Clark's (1916) specimens, declared that the specimen from south of Gabo Island, and similarly one from east of Maria Island (Tasmania), appeared to represent *H. sufflata* (Sladen), a species described from Kermadec Islands (north of New Zealand). The third specimen, from the Great Australian Bight, appeared identifiable within a group of species including *H. compacta* (Sladen), this species having been described from New Zealand waters. Fisher did not consider any of these three specimens to be Perrier's *H. hyadesi*, a species he believed to be conspecific with *H. obesa* (Sladen).

In 1946, H. L. Clark recorded Fisher's re-identification of the three 'Endeavour' specimens. However, on re-examining those specimens, and comparing them with other material held in the Museum of Comparative Zoology at Harvard, notably two specimens of *hyadesi* from off Patagonia and a cotype of *H. compacta* var. *aucklandiae* Mortensen (1925) from New Zealand waters, Clark was unable to reach a conclusion about the 'Endeavour' specimens. He determined the best course was to leave the 'Endeavour' material identified as *hyadesi*, with the provisional note that the Great Australian Bight material probably

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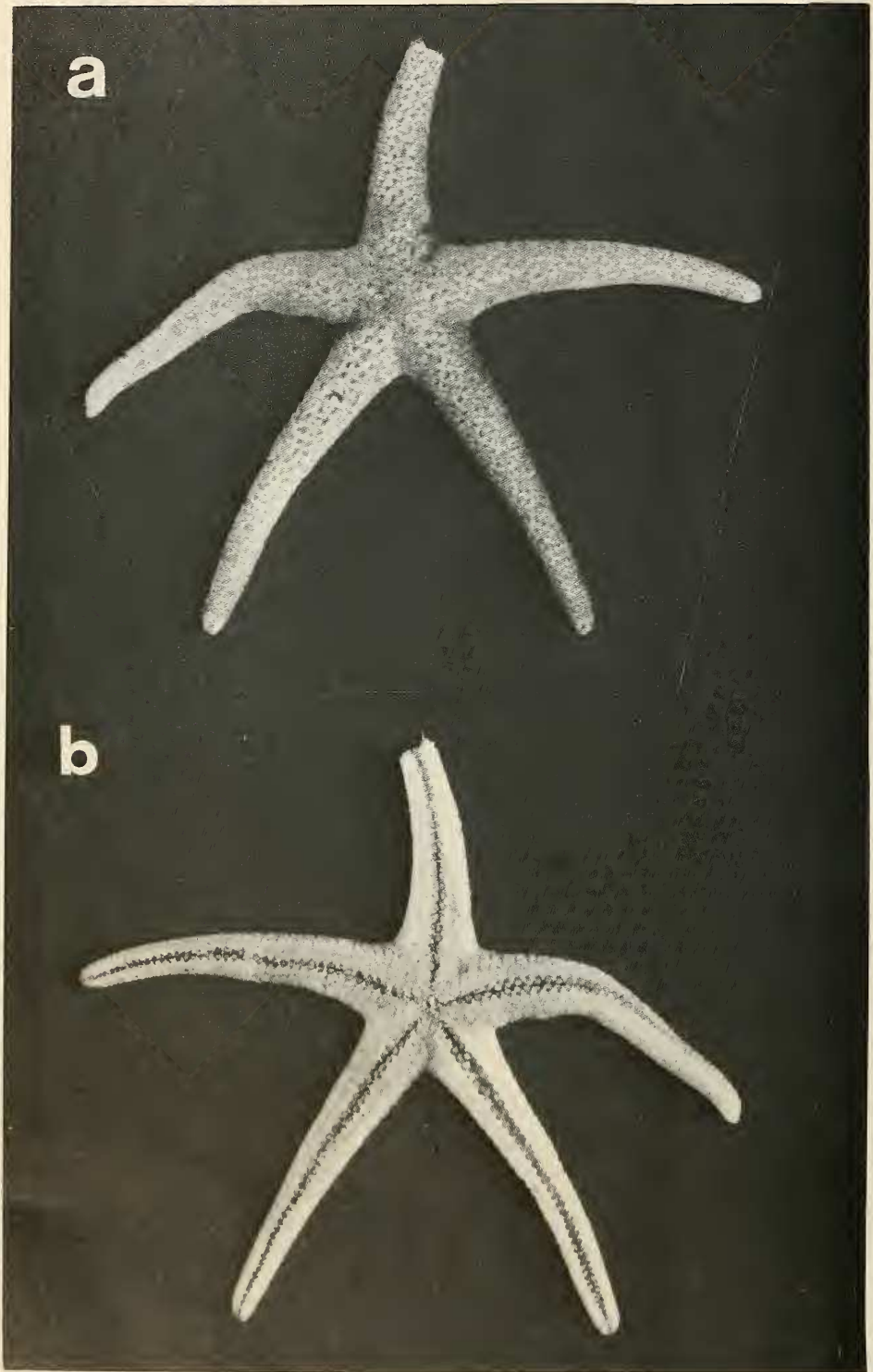


Fig 1. *Henricia compacta* (holotype, BM(NH) 1890.5.7.830). a. abactinal view; b. actinal view. (R = 15.5mm).

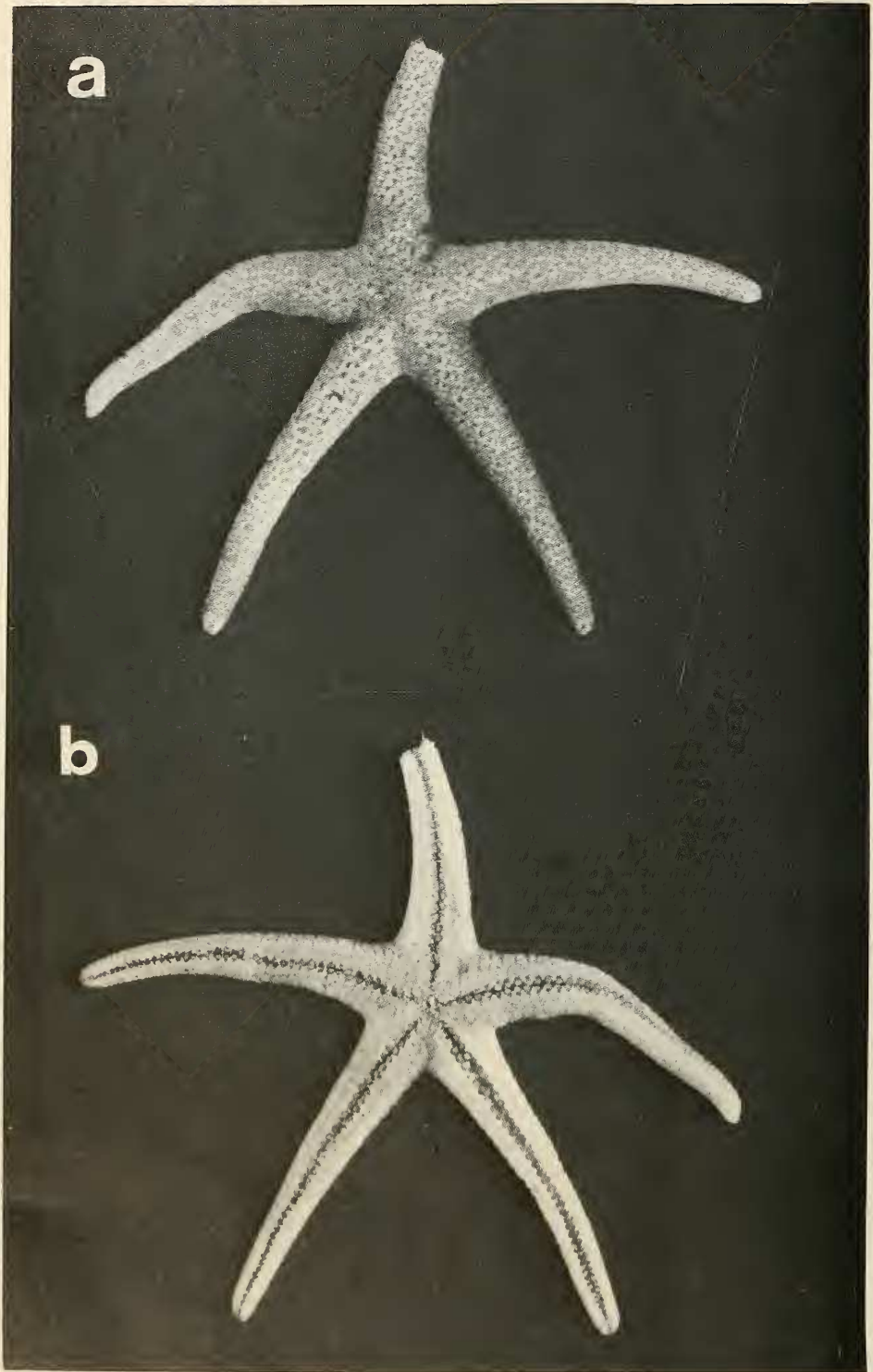


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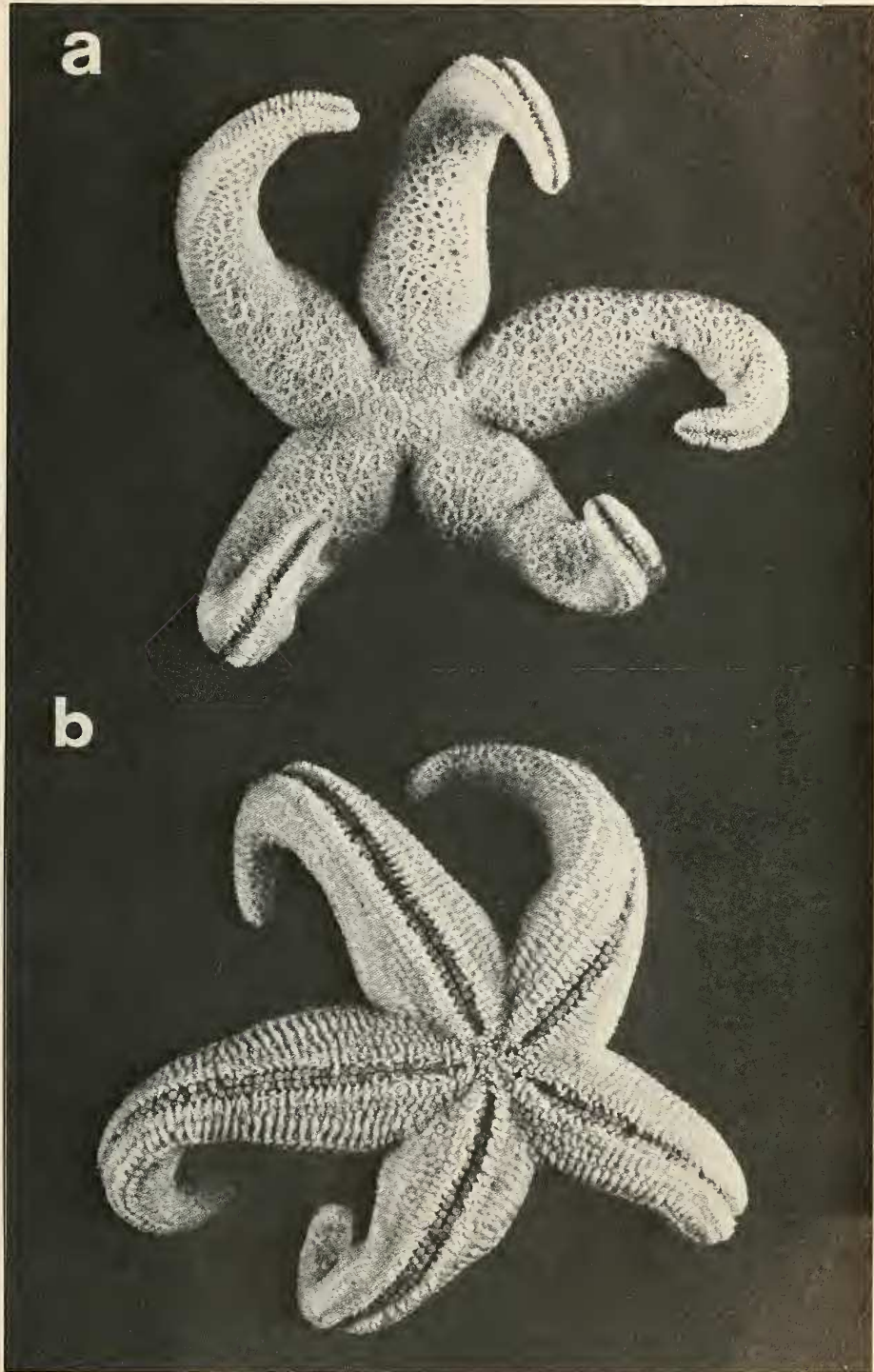


Fig. 2. *Henricia obesa* (holotype, BM(NH) 1890.5.7.831). a. abactinal view; b. actinal view (R = 71mm).

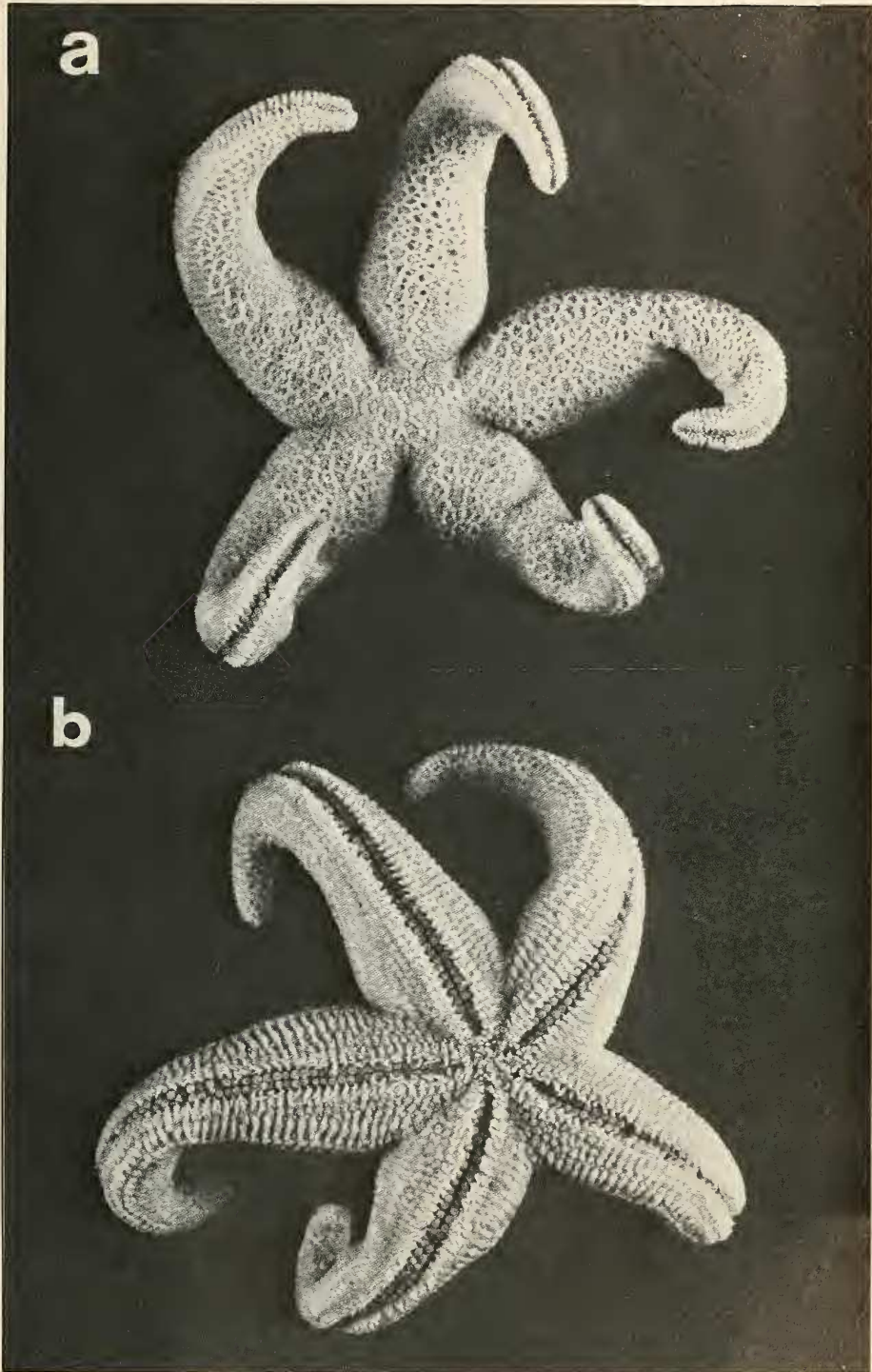


Fig. 2. *Henricia obesa* (holotype, BM(NH) 1890.5.7.831). a. abactinal view; b. actinal view (R = 71mm).

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Fisher (1911, 1940) and Hayashi (1940) both expressed the great variability of species within the genus *Henricia*, and the extreme difficulty in satisfactorily classifying them.

According to A. M. Clark (1962), Fisher (1940) had done much to clarify the inter-relationships of species within the genus *Henricia* when he grouped the Southern Ocean species into three superspecies. She (1962) noted Fisher's (1940) re-identification of three of H. L. Clark's (1916) Australian specimens of *Henricia* and accepted Fisher's (1940) synonymy of *hyadesi* (Perrier) with *obesa* (Sladen). A. M. Clark (1962) did not examine material from the Australian coast but suggested *obesa* ' . . . probably occurs off the south coast of Australia'. She also provided additional information about the holotype of *H. sufflata* (Sladen).

Hayashi (1973) commenting again on the difficulty of classifying the species of *Henricia* observed that the reproductive strategy of direct development might lead to limited distribution and that ' . . . this local isolation might have exerted the important influence on the differentiation of species'.

During the last decade some 250 specimens of *Henricia* have been collected from southeastern Australian waters (coast of New South Wales and eastern Victoria) during cruises of the N.S.W. State Fisheries Research Vessel 'Kapala'. These specimens have been deposited with the Australian Museum (AM) collections. This material has been examined as part of a Marine Sciences and Technologies Grants Scheme (MST) supported study of the echinoderm fauna of NSW. The material has been compared with the remaining 'Endeavour' specimens of *Henricia* held in the Australian Museum, 8 specimens from southern Australian (Victorian) waters held in the Museum of Victoria (MV), together with the holotype specimens of *H. compacta*, *H. sufflata* and *H. obesa* which are housed in the British Museum (Natural History) (BM(NH)), London. Comparisons have also been made with available material of New Zealand and South American species.

As a result of this study we conclude that both *H. compacta* and *H. obesa* occur in southeastern and southern Australian waters. Additionally a new species is recognized from New South Wales. Two 'Endeavour' specimens, which were identified as *hyadesi* by H. L. Clark (1916), 16 specimens collected more recently from New South Wales waters during 'Kapala' cruises and 7 from Victorian waters have features we recognize as warranting the establishment of a new echinasterid genus. This material together with a specimen from Japan, one from Washington State (west coast of North America), (United States National Museum, Washington, D.C., U.S.A.), and two from South African waters (BM(NH)), will be dealt with by us elsewhere.

SYSTEMATIC ACCOUNT
Family Echinasteridae
Genus *Henricia* Gray, 1840

Henricia compacta (Sladen)

Fig. 1a-b

Cribrella compacta Sladen, 1889: 543, p. XCVI, figs 1-2, pl. XCVIII, figs 3-4.

Henricia compacta, Mortensen, 1925: 307; Fisher, 1940: 163, 164, 166; H. E. S. Clark, 1970: 4.

Henricia hyadesi, H. L. Clark, 1916: 60(part), 1946: 148(part). [Non *H. hyadesi* (Perrier) = *H. obesa* (Sladen) according to Fisher, 1940: 164].

Diagnosis: R up to 85mm, r up to 14mm, R/r = 4.4-7.5; arms slender, tapering to a fairly acute tip; abactinal skeleton compact, plates crescentic; papular areas small, rarely contain-

represented a different species from that further east in Bass Strait and off eastern Tasmania.

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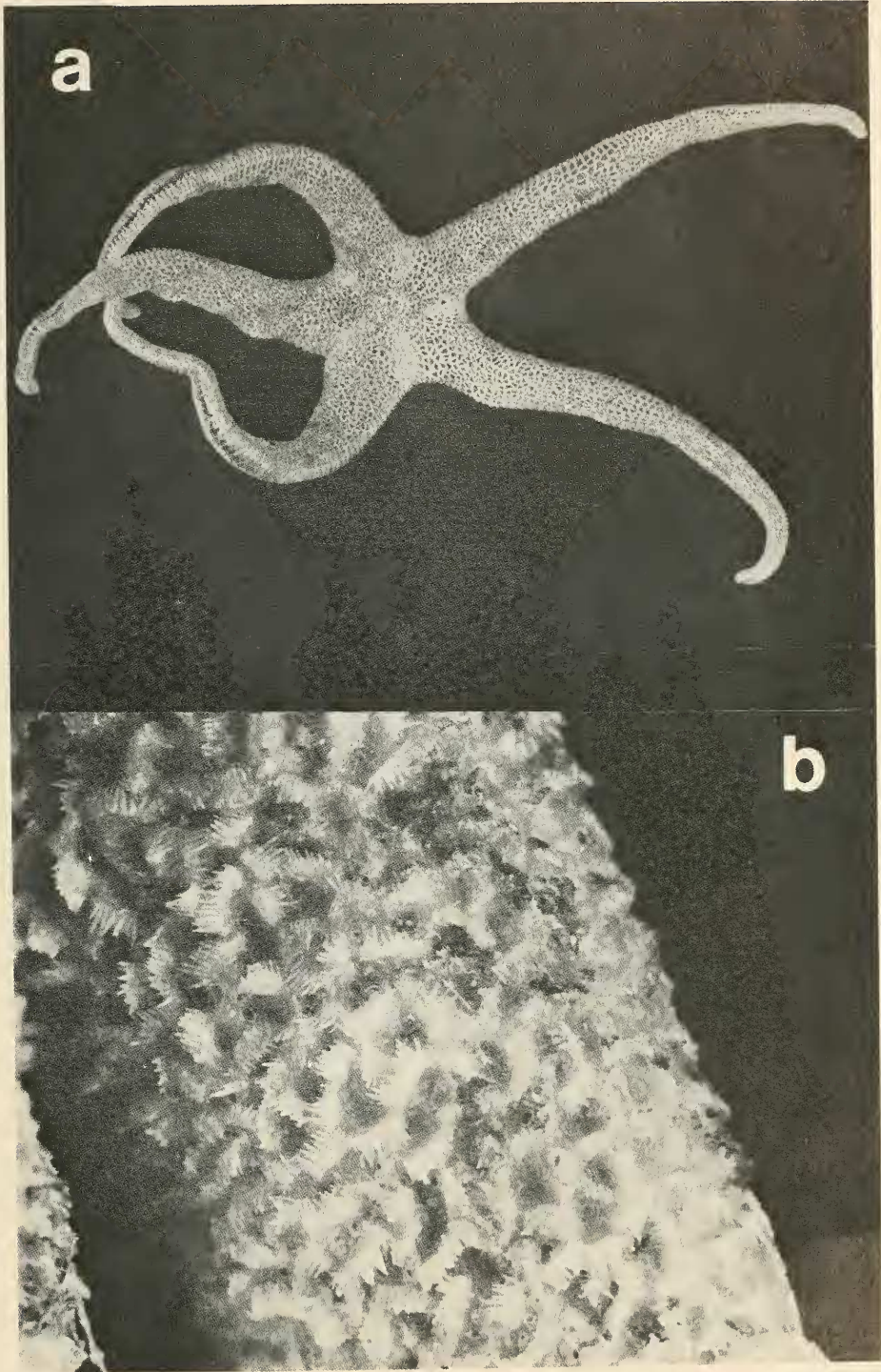


Fig. 3. Henricia kapalae sp. nov. (holotype; AM J19707). a. abactinal view (R = 56mm); b. spines on abactinal surface of ray.

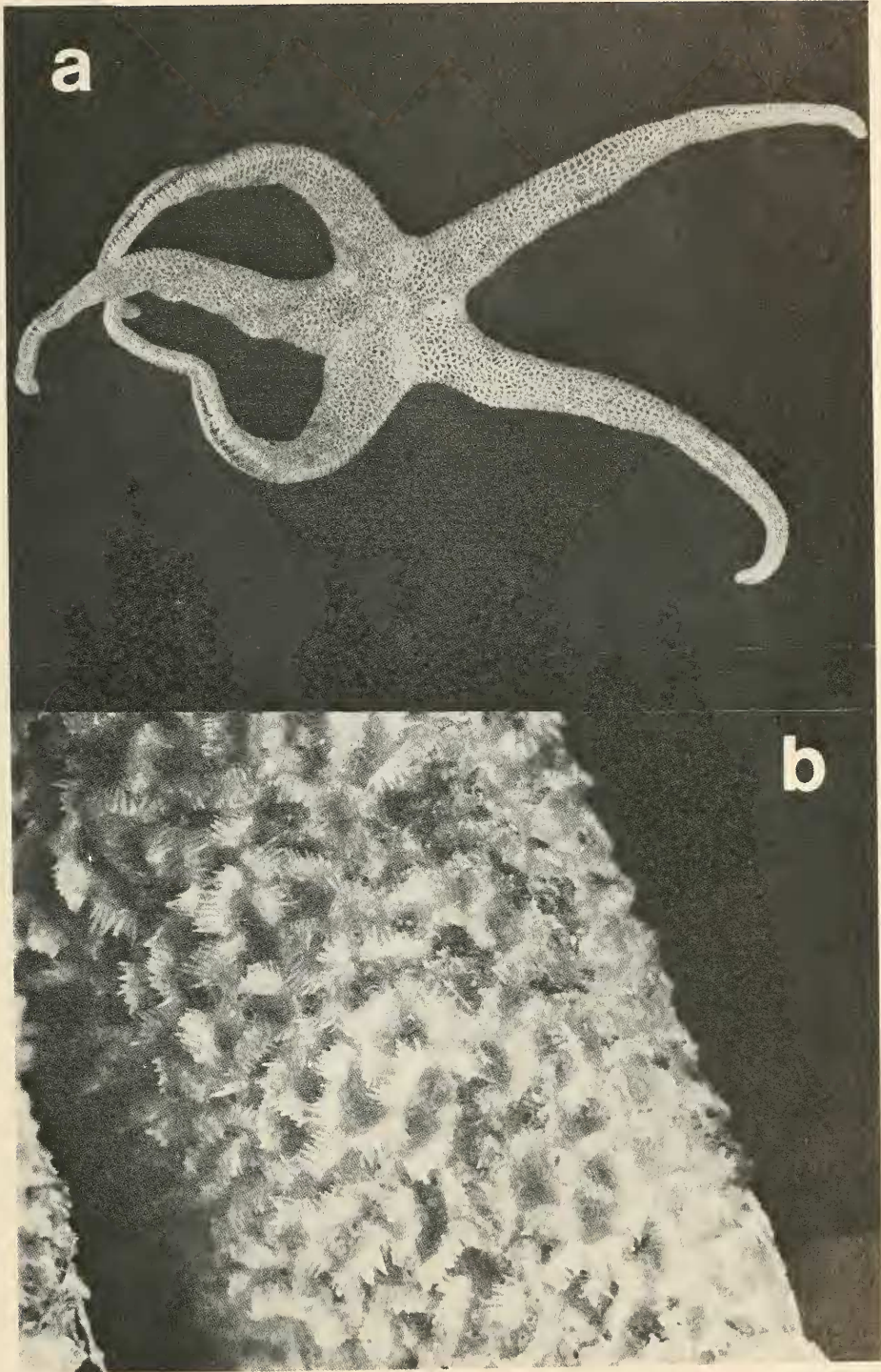


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Material examined: Holotype, BM(NH) 1890.5.7.830, 38°50'S, 169°20'E, off W coast of North Island of New Zealand, 503m; 2 specimens, AM J3075, E3773(1), Great Australian Bight, 146-274m; 1 specimen, E4716, S of Gabo Island, Victoria, 366m; 2 specimens, J19700, 58km off Mount Cann, Victoria, 205m; 2 specimens, J12886, 33°18.8'S, 127°19.3'E to 33°20.8'S, 127°29.7'E, off Terrigal, N.S.W., 300-310m; 1 specimen, J18629, 32°58.8'S, 152°41.6'E, off Newcastle, N.S.W., 1150-951m; 1 specimen, J12875, NE of Wollongong, N.S.W. 457m; 1 specimen J12863, 33°38'S, 151°57'E to 33°34'S, 152°01'E, E of Broken Bay, N.S.W., 786-805m; 1 specimen, J12860, 34°18'S, 151°26'E to 34°24'S, 151°23'E, E of Bulli (Wollongong), N.S.W. 457-476m; 2 specimens, J19701, 34°53'S, 151°08'E to 35°00'S, 151°06'E, off Lake Wollumboola, N.S.W., 412m; 1 specimen, J19699, 38°10'S, 149°52'E to 38°14'S, 149°43'E, SE of Point Hicks, Victoria, 457m; 6 specimens, J12859, 33°25'S, 152°E ' to 33°30'S, 152°07'E, off Broken Bay, N.S.W., 640m; 1 specimen, J12879, 34°18'S, 152°26'E to 34°24'S, 151°21'E, NE of Wollongong, N.S.W., 457-485m; 1 specimen, J19702, 34°28'S, 151°19'E to 34°34'S, 151°17'E, E of Port Kembla, N.S.W., 503m; 4 specimens, J12861, 34°39'S, 151°15'E to 34°32'S, 151°19'E, E of Kiama, N.S.W., 412m; 1 specimen, J12694, 33°40'S, 151°53'E to 33°46'S, 151°49'E, off Broken Bay, N.S.W., 384m; 4 specimens, J12882, 34°24'S, 151°25'E to 34°23'S, 151°25'E, SE of Sydney, N.S.W., 731-768m; 28 specimens, J13203, 33°35'S, 152°01'E to 33°32'S, 152°03'E, E of Broken Bay, N.S.W., 823m; 2 specimens J12869, 35°32'S, 150°46'E to 35°36'S, 150°43'E, E of Brush Island, N.S.W., 494m; 2 specimens, J12867, 37°48'S, 150°13'E to 33°37'S, 150°16'E, SE of Gabo Island, Victoria, 494m; 1 specimen, J19698, 38°06'S, 149°58'E to 38°00'S, 150°02'E, SE of Point Hicks, Victoria, 329m; 1 specimen, J17268, E of Nambucca Heads, N.S.W., 274m; 1 specimen, J12870, 35°32'S, 150°46'E to 35°35'S, 150°45'E, E of Brush Island, N.S.W., 503m; 5 specimens, J12881, 33°43'S, 151°46'E to 33°41'S, 151°43'E, E of Broken Bay, N.S.W., 170m; 1 specimen, J13207, 37°39'S, 159°19'E to 37°42'S, 150°18'E, SE of Gabo Island, Victoria, 731m; 19 specimens, J13193, 33°34'S, 152°02'E to 33°31'S, 152°04'E, E of Broken Bay, N.S.W., 914m; 15 specimens, J13192, 33°35'S, 152°00'E to 33°33'S, 152°02'E, off Broken Bay, N.S.W., 823m; 8 specimens, J13201(1), J17262(1), J13256(6), 34°22'S, 151°23'E to 34°19'S, 151°25'E, E of Wollongong, N.S.W., 823m; 1 specimen, J12880, 29°45'S, 153°45'E to 29°42'S, 153°46'E, off Sandon Bluffs, N.S.W., 503m; 1 specimen (eight arms), J19703, 35°02'S, 151°06'E to 34°58'S, 151°08'E, off Shoalhaven Bight, N.S.W., 439-420m; 36 specimens, J13332, 33°36'S, 152°06'E to 33°34'S, 152°08'E, E of Broken Bay, N.S.W., 914m; 3 specimens, 33°32'S, 152°06'E to 33°34'S, 152°05'E, off Broken Bay, N.S.W., 823m; 9 specimens, J13277(7), J17263(2), 33°39'S, 152°06'E to 33°37'S, 152°07'E, off Long Reef (Collaroy), N.S.W., 1006m; 6 specimens, J17265(2), J17267(4), 33°38'S, 152°02'E to 33°36'S, 152°04'E, off Long Reef (Collaroy), N.S.W., 960-988m; 1 specimen, J18618, 35°30'S, 150°52'E to 35°28'S, 150°53'E, off Brush Island, N.S.W., 933-988m.

Distribution: Southern Australia (Great Australian Bight) and Tasman Sea, from

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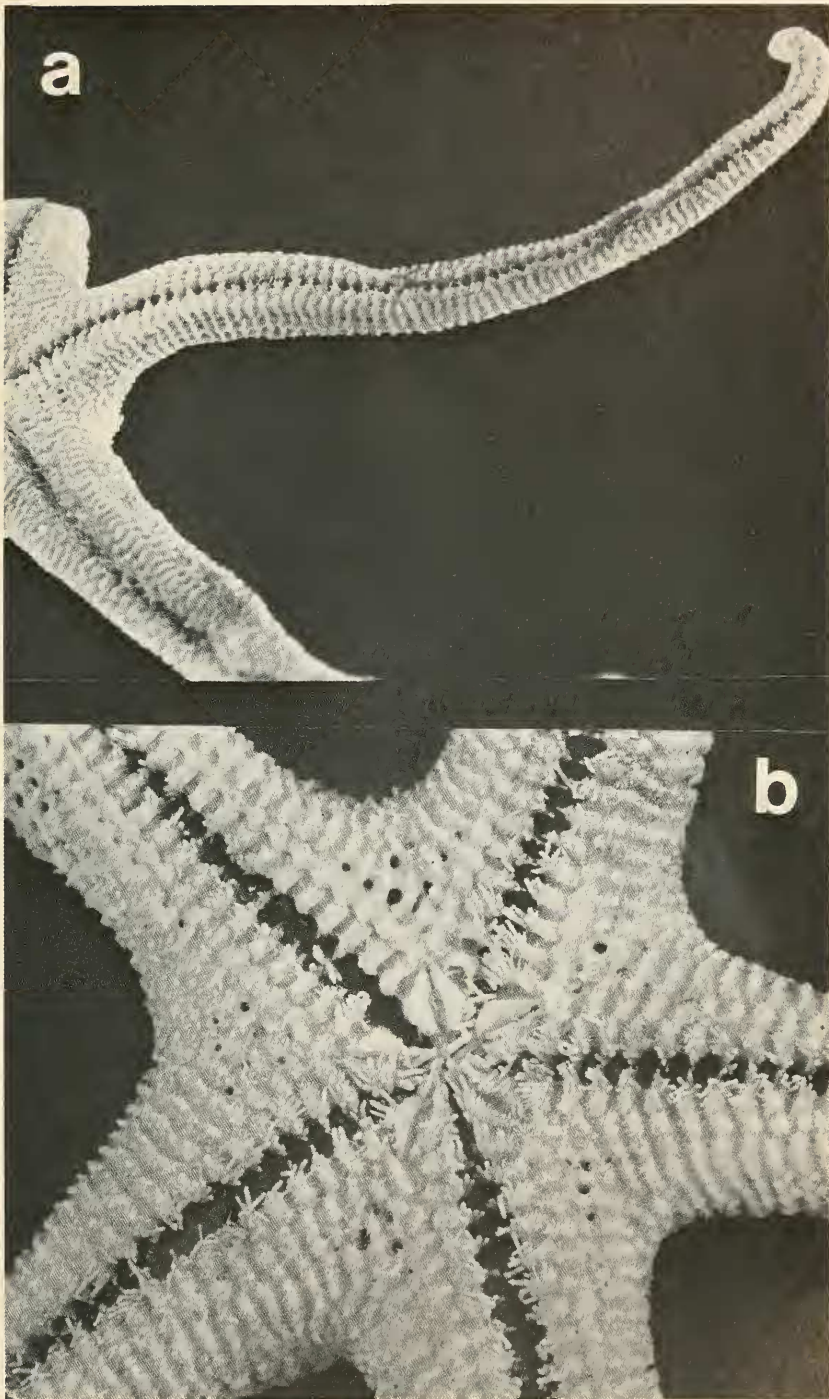


Fig. 4. *Henricia kapalae* sp. nov. (holotype; AM J19707). a. actinal surface and marginal plates; b. actinal surface with oral plate spine detail.

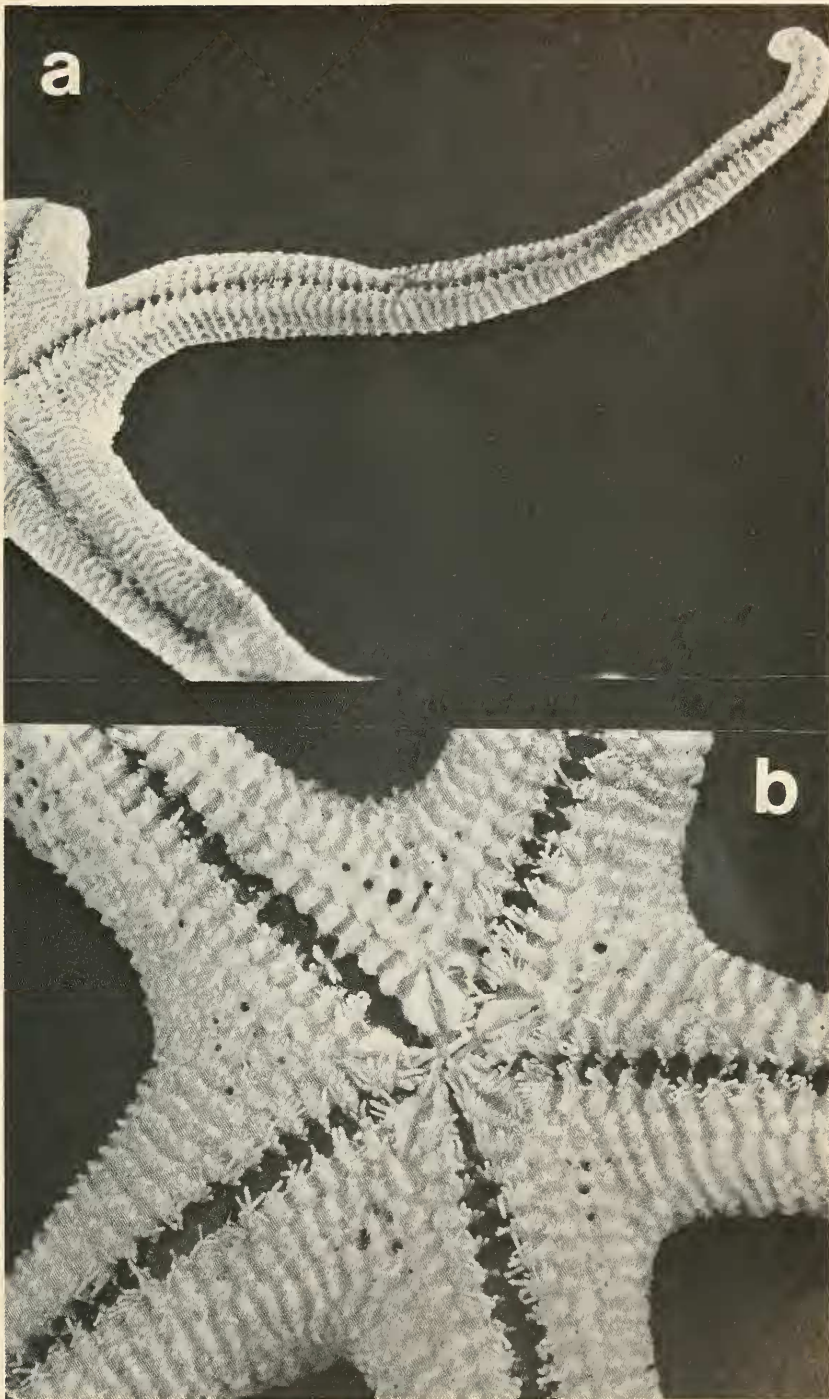


Fig. 4. *Henricia kapalae* sp. nov. (holotype; AM J19707). a. actinal surface and marginal plates; b. actinal surface with oral plate spine detail.

southeastern Australia (Sandon Bluffs, N.S.W. — Point Hicks, Victoria) to the west coast of New Zealand, in depths ranging from 146-1150m.

Remarks: *H. compacta* (Sladen) is based on a juvenile specimen (R=15.5mm) which Sladen considered 'sufficiently well marked to justify its being regarded as a distinct species'. He enumerated its delicate form, large plates with compact groups of numerous spinelets, small papulae areas, distinct marginals and armature of adambulacral plates as characteristic of the species. Examination of some 170 specimens in the present collection ranging from R=20-85mm has shown that the arms tend to become relatively more elongate with growth (i.e. the disc does not increase in width beyond R=c.30-40mm), that the marginal plates become less prominent beyond R=40mm and there are two (often three in larger specimens) furrow spines on the vertical face of the adambulacral plates, even in the small holotype. The relationships of this species have been discussed by Fisher (1940).

Henricia obesa (Sladen)

Fig. 2a-b

Cribrella obesa Sladen 1889: 544, pl. XCVI, figs 3-4, pl. XCVIII, figs 5-6.

Cribrella hyadesi Perrier, 1891: 100, pl. IX, fig. 1, pl. X, fig. 2.

Henricia hyadesi, H. L. Clark, 1916: 60(part); 1946: 148(part).

Henricia obesa, Fisher, 1940: 164; A. M. Clark, 1962: 48, figs 5n, 6a-c.

Diagnosis: R up to 100mm, r up to 14mm, R/r=4.0-5.6, rarely to 7.1; arms slightly inflated proximally, slender distally, tapering to a narrow, rounded tip; abactinal skeleton reticulate, open meshwork, 1-2 small accessory plates sometimes present in papular areas, 1-6 papulae per area; abactinal spinelets stout (0.3-0.4mm long, 0.1-0.15mm wide), rounded to slightly bulbous at the tip, terminating in many points, up to about 20 spinelets per plate, in single or double rows; marginal plates prominent in the holotype, less so in any other material without clearing of spinelets; 16-18 inferomarginal plates per 20 adambulacrals, marginal plates quadrilobed, superomarginals slightly smaller than inferomarginals; intermarginal plates, 1-3 rows proximally, reducing to one row, extending to 1/2-2/3R; two rows of actinal plates, second row extending only to 1/4R, actinal plates with up to 10 spinelets; adambulacral plates with two furrow spinelets on vertical surface; usually a single, prominent subambulacral spine on the adradial edge of the plate, behind which are 6-8 spines which decrease in size across the plate, these are arranged either 2 or 3 in single series, the remaining 4-6 spines in pairs, or all are more or less in pairs behind the innermost spine; papulae occur between the intermarginal plates and are larger and prominent between the actinal plates along the arms.

Material examined: Holotype, BM(NH)1890.5.7.831, 51°40'S, 57°50'W, Port William, Falkland Islands, 22m; 1 specimen, MV75-9, 38°44'S, 141°33'E, 30km S of Cape Nelson, Victoria, 155.4m; 2 specimens, AM E5933, 58km S of Mt. Cann, Victoria, 205m; 1 specimen, E4712, S of Gabo Island, Victoria, 365m; 1 specimen, E5031, off Babel Island, Bass Strait, 73-110m; 1 specimen, J5855, Bass Strait, trawled; 2 specimens, J8791, off Newcastle, N.S.W. trawled; 1 specimen, J19697, off Eden, N.S.W., trawled; 3 specimens, J18628, E of Gabo Island, Victoria, 402-439m; 1 specimen, J12878, 34°09'S, 151°16'E to 34°03'S, 151°21'E, E of Cronulla, N.S.W., 126-132m; 1 specimen, J13287, 34°37'S, 151°16'E to 34°44'S, 151°12'E, E of Kiama, N.S.W., 457m; 1 specimen, J12689, 34°49'S, 151°10'E to 34°56'S, 151°09'E, E of Shoalhaven Bight, 457-475m; 12 specimens, J12691, 34°53'S, 151°08'E to 35°00'S, 151°06'E, E of Shoalhaven Bight, N.S.W., 402-439m; 3 specimens, J12858, 35°38'S, 150°40'E to 35°32'S, 150°45'E, E of Brush Island, N.S.W., 393-439m; 9 specimens, J12864(6), J12876(1), J12692(2), 37°45'S, 150°12'E to 37°38'S, 150°16'E, SE of Gabo Island, 402-439m; 1 specimen, J12693, 38°10'S, 149°52'E to 38°14'S, 149°43'E, E of Cape Everard, Victoria; 1 specimen, J12690, 34°28'S, 151°19'E to

southeastern Australia (Sandon Bluffs, N.S.W. — Point Hicks, Victoria) to the west coast of New Zealand, in depths ranging from 146-1150m.

Remarks: *H. compacta* (Sladen) is based on a juvenile specimen (R=15.5mm) which Sladen considered 'sufficiently well marked to justify its being regarded as a distinct species'. He enumerated its delicate form, large plates with compact groups of numerous spinelets, small papulae areas, distinct marginals and armature of adambulacral plates as characteristic of the species. Examination of some 170 specimens in the present collection ranging from R=20-85mm has shown that the arms tend to become relatively more elongate with growth (i.e. the disc does not increase in width beyond R=c.30-40mm), that the marginal plates become less prominent beyond R=40mm and there are two (often three in larger specimens) furrow spines on the vertical face of the adambulacral plates, even in the small holotype. The relationships of this species have been discussed by Fisher (1940).

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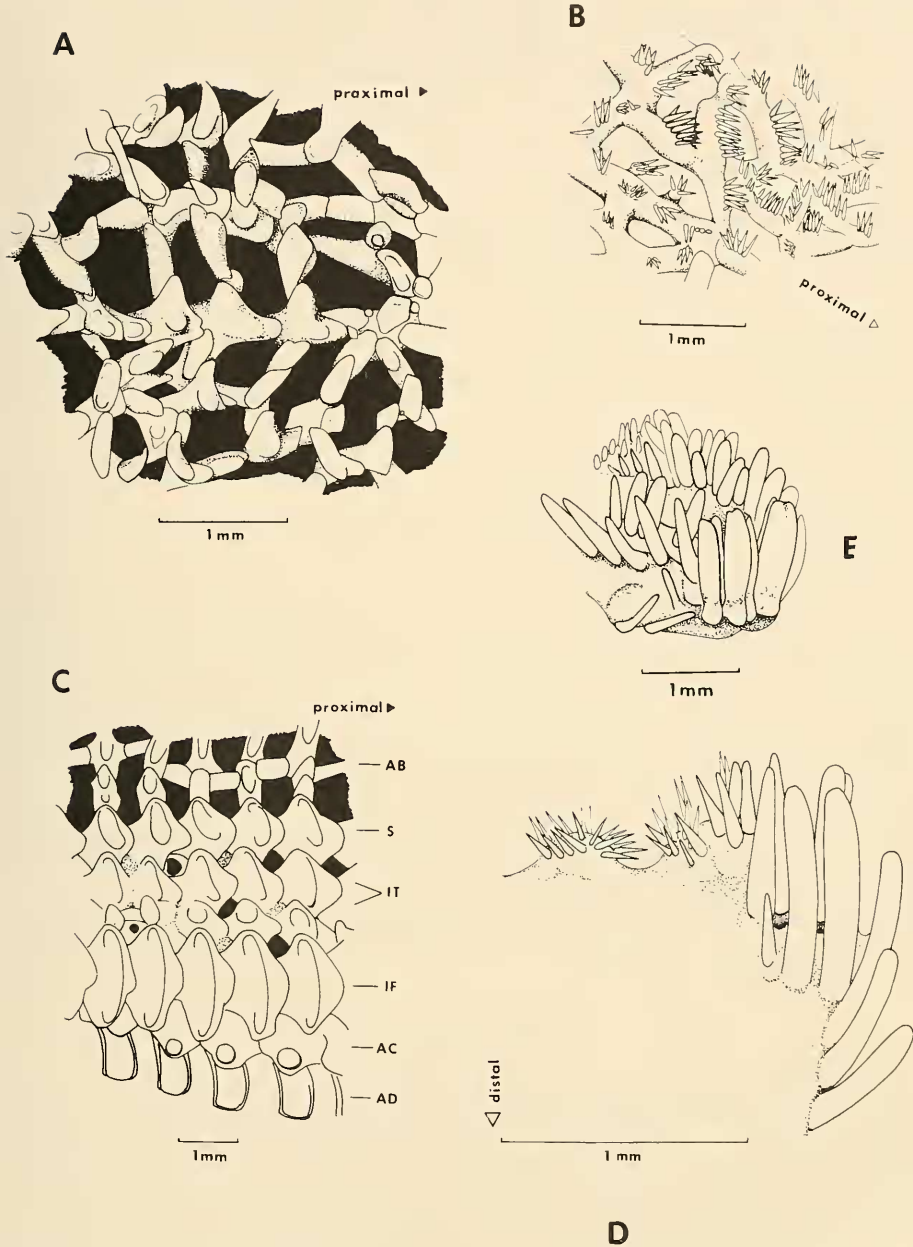


Fig. 5. *Henricia kapalae* sp. nov. (holotype; AM J19707). A. denuded abactinal plates of ray (proximal); B. abactinal ray spines (proximal); C. denuded marginal plates, from 13th to 17th inferomarginal plates. AB = abactinal plates, S = superomarginal plates, IT = intermarginal plates, IF = inferomarginal plates, AC = actinal plates, AD = adambulacral plates; D. adambulacral and actinal plates and spines; E. oral plate pair with spines.

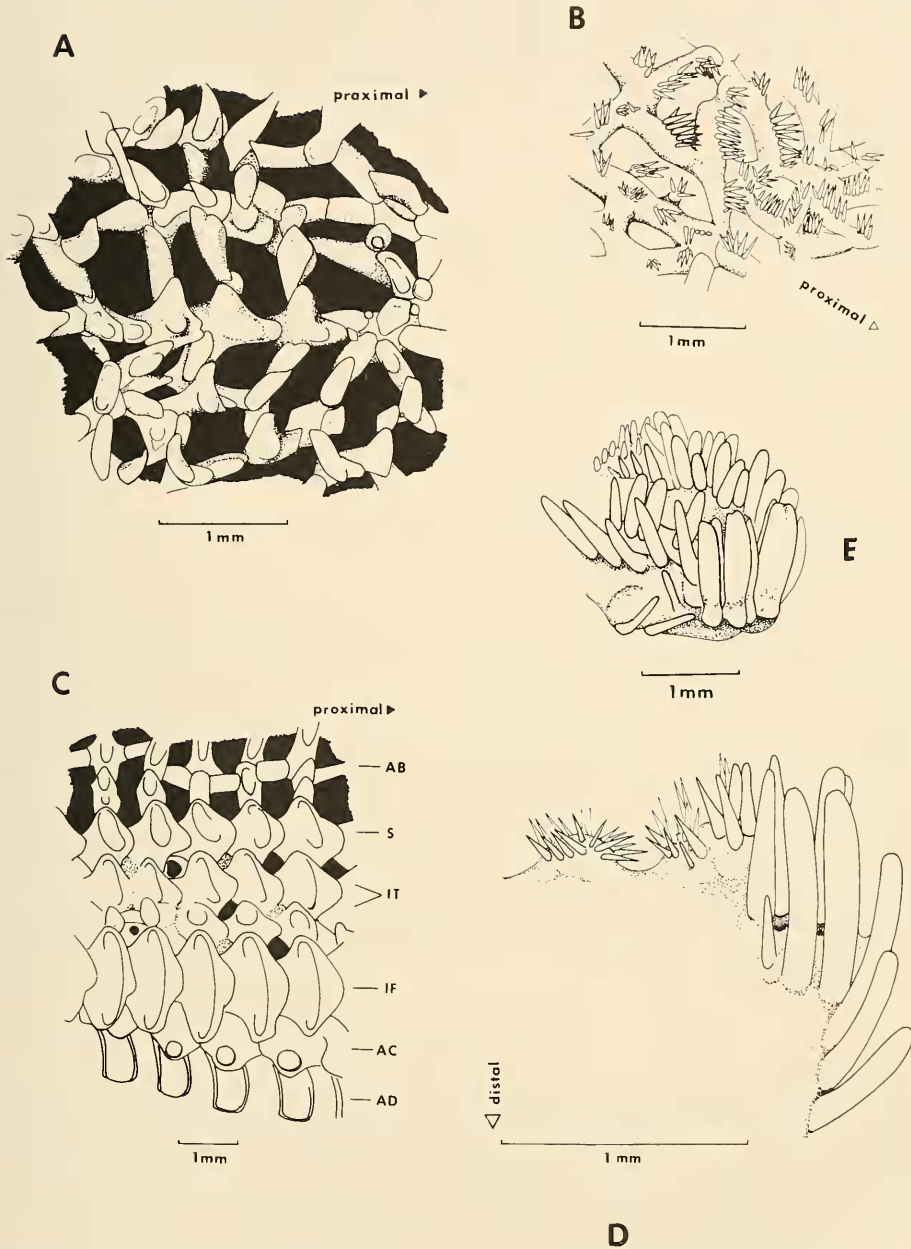


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34°34'S, 151°17'E, E of Port Kembla, N.S.W., 402m; 2 specimens, J12877, 35°29'S, 150°47'E to 35°25'S, 150°50'E, SE of Ulladulla, N.S.W., 439m; 3 specimens, J19696, 34°39'S, 151°15'E to 34°32'S, 151°19'E, E of Kiama, 412m; 4 specimens, J12872, 38°00'S, 150°02'E to 38°06'S, 149°58'E, SE of Point Hicks, Victoria, 330m; 1 specimen, J10875, 35°32'S, 150°46'E to 35°35'S, 150°44'E, E of Brush Island, N.S.W., 384m; 1 specimen, J12873, 35°36'S, 150°44'E to 35°31'S, 150°47'E, E of Bird Island, N.S.W., 604m; 3 specimens, J13195, 35°32'S, 150°46'E to 35°34'S, 150°45'E, E of Brush Island, N.S.W., 384m; 3 specimens, J12865, 35°01'S, 151°06'E to 34°58'S, 151°07'E, E of Brush Island, N.S.W., 420m; 1 specimen, J19695, 33°40'S, 151°53'E to 33°46'S, 151°49'E, off Broken Bay, N.S.W., 384m; 2 specimens, J12862, 35°32'S, 150°45'E to 35°46'S, 150°35'E, E of Brush Island, N.S.W., 219-274m; 1 specimen, J13289, 35°00'S, 151°07'E to 34°59'S, 151°08'E, off Beecroft Peninsula, N.S.W., 420m; 7 specimens; J13288, 35°02'S, 151°06'E to 34°51'S, 151°08'E, off Shoalhaven Bight, N.S.W. 365m; 3 specimens, J12857, 35°33'S, 150°45'E to 35°38'S, 150°41'E, 402m.

Distribution: Widespread in the Southern Ocean, including Tristan da Cunha (Atlantic), southern and southeastern Australia (off Newcastle, N.S.W., to Bass Strait and westward to Cape Nelson, Victoria) and Macquarie Island (south of New Zealand) in depths ranging from 22-604m.

Remarks: Comparison of the present material with the holotype of *H. obesa* leaves little doubt that it is representative of that species. Structural variation appears to be relatively slight, involving less pronounced marginal plates, the occurrence of subambulacral spines in single to double rows across the adambulacral plates, and similarly, spinelets forming single to double rows across the abactinal plates.

A. M. Clark noted (1962) that *obesa* differed from *sufflata* in its more robust abactinal skeleton, the arrangement and higher number of abactinal spinelets and in the larger size of the marginal plates relative to the adambulacral plates. Our examination of the holotype of *H. sufflata* has confirmed these differences. However, the extent of the intermarginal plates in *obesa* is greater than Clark (1962) suggests, extending in our material to at least 1/2R if not to 2/3R. We do not consider this to be of significance in determining the identity of our material. In coming to this conclusion, we therefore disagree with Fisher's (1940) identification of some of H. L. Clark's (1916) specimens as *sufflata*. In fact, H. L. Clark (1916, 1946) was substantially correct in his identification of the 'Endeavour' *Henricia* material as *H. hyadesi*, since that species is considered a junior synonym of *H. obesa* (Sladen) by Fisher (1940) and A. M. Clark (1962).

The identification of *obesa* in southern and southeastern Australian waters is now confirmed. The relationships of this species are fully discussed by A. M. Clark (1962).

Henricia kapalae sp. nov.

Figs 3a-b, 4a-b, 5A-E

Diagnosis: R=26-97mm, r=4.2-17.5mm, R/r=4.8-7.2mm, arms slender, with acute tip; skeletal reticulum relatively compact, abactinal skeletal plates with single (rarely irregularly double), webbed row of slender spinelets; marginal plates more or less distinct, inferomarginal plates twice as wide as superomarginal plates; intermarginal plates extend to 1/4R; 2 actinal rows of plates, the innermost extending to 1/4R; 2-3 spines in vertical series in furrow; 1-4 papulae per area, actinally papulae restricted to disc.

Material examined: Holotype, AM J19707, 33°39'S, 152°06'E to 33°37'S, 152°07'E, off Broken Bay, N.S.W., 990m; 16 paratypes, J19704(3), 33°35'S, 152°01'E to 33°32'S, 152°03'E, off Broken Bay, N.S.W., 450m; J19711(3), 33°30'S, 152°07'E, off Broken Bay, N.S.W., 905m; J19710(1), 33°35'S, 152°03'E, off Broken Bay, N.S.W., 823m; J19708(3), 33°39'S, 152°06'E, to 33°37'S, 152°07'E, off Broken Bay, N.S.W., 990m; J19705(1),

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33°36'S, 152°06'E, off Broken Bay, N.S.W., 914m; J19709(1), 33°43'S, 151°46'E to 33°41'S, 151°43'E, off Broken Bay, N.S.W., 170m; J13323(1), 34°54'S, 151°12'E to 34°57'S, 151°11'E, off Shoalhaven, N.S.W., 540m; J18617(1), 35°29'S, 150°52'E to 35°26'S, 150°55'E, off Brush Island N.S.W., 1006m; J19679(1), 35°30'S, 150°54'E to 35°27'S, 150°55'E, off Brush Island, N.S.W., 979-1070m; J19706(1), 35°38'S, 150°40'E to 35°32'S, 150°45'E, off Brush Island, N.S.W., 393-439m.

Distribution: Between Broken Bay and Brush Island, N.S.W., in depths ranging between 170-1070m.

Etymology: Named for FRV 'Kapala' N.S.W. State Fisheries Research Vessel from which all specimens were collected.

Description: Rays 5 slender, tapering to a narrow tip, $R=26-97\text{mm}$, $r=4.2-17.5\text{mm}$, $R/r=4.8-7.2$, $Br=4.2-17.5$ (Holotype, $R=56\text{mm}$, $r=8\text{mm}$, $R/r=7.0\text{mm}$, $Br=9\text{mm}$). The disc is relatively small. The madreporite which bears small spinelets, occurs interradially, about $2/3r$ from the centre of the disc. Abactinal plates are irregularly bar-like to crescentic in shape, forming an irregular, relatively compact reticulum. The medial region of the plates is raised into a low ridge, which bears a single, webbed row, occasionally an irregular double row, of delicate, finely tapered spinelets. The spinelets measure up to 0.5mm in length.

There are 1-4 papulae per area abactinally. The papulae extend to the actinal surface, where they occur one per area, restricted to the disc.

Marginal plates distinct due to their regular shape and alignment. The superomarginals are much smaller and less prominent than the inferomarginals. The superomarginals are quadrilobed, about as long as wide, with a slightly oblique, actinal/abactinal directed ridge bearing spinelets. The inferomarginal plates are also quadrilobed, about twice as wide as long, and therefore twice as wide as the superomarginals. The inferomarginal plates each bear a slightly oblique ridge bearing spinelets up to 0.70mm long. The spines are usually in a single more or less uniform row but on some specimens, including the holotype, the spines occur in an irregular double row. Intermarginal plates, similar to the superomarginal plates, occur in 2-3 rows, the longest series extending to only about $1/4R$. There are 25 inferomarginal plates per 20 adambulacral plates. Actinal plates occur in two rows, the first row extends only to about $1/4R$, the second comprising 2-3 plates in the actinal angle. The plates are centrally ridged, and bear a group of spines, the central ones of which are the largest.

The adambulacral plates bear 2(3) stout, cylindrical spines in vertical series in the furrow. There is a single prominent, cylindrical spine on the adradial edge of the plate behind which occurs two similar spines. Behind this group of spines is a further group of three slightly shorter spines followed by up to 20 smaller, slender spines which are similar to those on the actinal and abactinal plates.

The oral plates bear the usual complement of spines.

Remarks: *H. kapalae* is immediately distinguished from *H. compacta* on skeletal morphology and spine armament, even though they show a similar shape of tapering arms. The stouter arms, shape of spinelets, fewer inferomarginal plates to adambulacral plates, less prominent marginal plates and extent of actinal papulae all serve to easily distinguish *H. obesa* from *H. kapalae*.

H. kapalae clearly falls into Hayashi's (1940) B-group of species from Japanese waters. It differs from each of those species, *H. pacifica* Hayashi, *H. aspera* Fisher, *H. ohshimai* Hayashi, *H. ohshimai acutispina* Hayashi and *H. pachyderma* in: having regularly 2 spines in vertical series in the furrow; the form of the marginal plates and spines; and spine arrangement. The very delicate, open skeletal reticulum and spine form and arrangement of *H. mutans* Koehler, from the Andaman Islands, and *H. arcystata* Fisher, from Philippine seas, excludes the identification of the N.S.W. material with either of those species.

33°36'S, 152°06'E, off Broken Bay, N.S.W., 914m; J19709(1), 33°43'S, 151°46'E to 33°41'S, 151°43'E, off Broken Bay, N.S.W., 170m; J13323(1), 34°54'S, 151°12'E to 34°57'S, 151°11'E, off Shoalhaven, N.S.W., 540m; J18617(1), 35°29'S, 150°52'E to 35°26'S, 150°55'E, off Brush Island N.S.W., 1006m; J19679(1), 35°30'S, 150°54'E to 35°27'S, 150°55'E, off Brush Island, N.S.W., 979-1070m; J19706(1), 35°38'S, 150°40'E to 35°32'S, 150°45'E, off Brush Island, N.S.W., 393-439m.

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The oral plates bear the usual complement of spines.

Remarks: *H. kapalae* is immediately distinguished from *H. compacta* on skeletal morphology and spine armament, even though they show a similar shape of tapering arms. The stouter arms, shape of spinelets, fewer inferomarginal plates to adambulacral plates, less prominent marginal plates and extent of actinal papulae all serve to easily distinguish *H. obesa* from *H. kapalae*.

H. kapalae clearly falls into Hayashi's (1940) B-group of species from Japanese waters. It differs from each of those species, *H. pacifica* Hayashi, *H. aspera* Fisher, *H. ohshimai* Hayashi, *H. ohshimai acutispina* Hayashi and *H. pachyderma* in: having regularly 2 spines in vertical series in the furrow; the form of the marginal plates and spines; and spine arrangement. The very delicate, open skeletal reticulum and spine form and arrangement of *H. mutans* Koehler, from the Andaman Islands, and *H. arcystata* Fisher, from Philippine seas, excludes the identification of the N.S.W. material with either of those species.

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